

67108-040; Sung 2

IN THE CLAIMS

1. (Currently amended) A method of removing the Doppler frequency shift in a spread spectrum communications signal comprising the steps of:

receiving a spread spectrum communications signal within a communications receiver a spread spectrum communications signal having a dedicated physical channel and common pilot channel;

estimating the Doppler change in frequency using the common pilot channel; and

removing the Doppler change in frequency within the dedicated physical channel using the estimated Doppler change in frequency.

2. (Original) A method according to Claim 1, and further comprising the step of receiving the spread spectrum communications signal within a rake receiver.

3. (Original) A method according to Claim 1, wherein said spread spectrum communication signal comprises a code division multiple access (CDMA) communications signal.

4. (Original) A method according to Claim 1, wherein the step of estimating further comprises the step of multiplying a channelization code into respective In-phase (I) and Quadrature (Q) channels, summing over a symbol period, and sampling to obtain respective I and Q sampled values.

5. (Original) A method according to Claim 4, and further comprising the step of phase shifting and taking an arctangent of I and Q sampled values to estimate the Doppler frequency shift.

67108-040; Sung 2

6. (Original) A method according to Claim 5, and further comprising the step of estimate sine and cosine values of the estimated Doppler frequency shift to be multiplied within the dedicated physical channel.

7. (Original) A method according to Claim 1, and further comprising the step of splitting the dedicated physical channel into I and Q data channels that receive an estimated Doppler change in frequency.

8. (Original) A method according to Claim 7, and further comprising the step of estimating the Doppler change in frequency within respective I and Q Doppler estimation channels.

9. (Currently amended) A method of removing the Doppler frequency shift in a spread spectrum communications signal comprising the steps of:

receiving a spread spectrum communications signal within a rake receiver ~~a spread spectrum communications signal~~ having a dedicated physical channel and common pilot channel;

estimating the Doppler change in frequency within a pilot channel rake section using the common pilot channel; and

removing the Doppler change in frequency of the spread spectrum communications signal within a data channel rake section by multiplying the Doppler change in frequency estimated from the pilot channel rake section into the dedicated physical channel.

10. (Original) A method according to Claim 9, wherein the step of estimating further comprises the step of multiplying a channelization code into respective In-phase (I) and Quadrature (Q) channels, summing over a symbol period, and sampling to obtain respective I and Q sampled values.

67108-040; Sung 2

11. (Original) A method according to Claim 10, and further comprising the step of phase shifting and taking an arctangent of I and Q sampled values to estimate the Doppler frequency shift.

12. (Original) A method according to Claim 11, and further comprising the step of estimating sine and cosine values of the estimated Doppler frequency shift to be multiplied within the dedicated physical channel.

13. (Original) A method according to Claim 9, and further comprising the step of splitting the dedicated physical channel into I and Q data channels that receive an estimated Doppler change in frequency.

14. (Original) A method according to Claim 13, and further comprising the step of estimating the Doppler change in frequency within respective I and Q Doppler estimation channels.

15. (Currently amended) A communications receiver that removes the Doppler frequency shift in a spread spectrum communications signal comprising:

a pilot channel rake section having I and Q Doppler estimation channels for estimating the Doppler change in frequency in the communications signal based on a common pilot channel; and

a data channel rake section having I and Q data channels for receiving the data in the communications signal, which has the frequency error caused by the Doppler effect.

16. (Original) A communications receiver according to Claim 15, wherein each I and Q data channel comprises a delay circuit for receiving respective I and Q signals split from the spread spectrum communications signal at baseband and sine and cosine branches for receiving and multiplying into the sine and cosine branches the estimated Doppler change in frequency.

67108-040; Sung 2

17. (Original) A communications receiver according to Claim 16, and further comprising an addition circuit for adding together any multiplied product received from respective sine and cosine branches.

18. (Original) A communications receiver according to Claim 15, and further comprising an integrator for introducing a spreading factor when canceling any Doppler error.

19. (Original) A communications receiver according to Claim 15, wherein each I and Q Doppler estimation channel comprises a mixer for receiving the spread spectrum communications signal at baseband and a channelization code.

20. (Original) A communications receiver according to Claim 15, wherein each I and Q Doppler estimation channel comprises a integrator and sample and delay circuit.

21. (Original) A communications receiver according to Claim 20, wherein each sample and delay circuit further comprises a phase shifter.

22. (Original) A communications receiver according to Claim 20, wherein each sample and delay circuit further comprises a multiplier for receiving a delay signal from the respective other I or Q Doppler estimation channel.